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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ABBAS RAZAVI

Appeal 2008-3875
Application 10/562,718
Technology Center 1700

Decided: January 29, 2009

Before EDWARD C. KIMLIN, TERRY J. OWENS, and
JEFFREY T. SMITH, *Administrative Patent Judges*.

SMITH, *Administrative Patent Judge*.

DECISION ON APPEAL

This is a decision on an appeal under 35 U.S.C. § 134 from the Primary Examiner's rejection of claims 12-25. We have jurisdiction pursuant to 35 U.S.C. § 6.¹

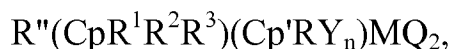
¹ In rendering this decision we have considered the Appellant's arguments presented in the Appeal Brief dated July 03, 2007.

Appellant's invention is directed to a process for the preparation of an isotactic/syndiotactic polypropylene blend comprising: (a) providing a catalyst system comprising an isospecific metallocene catalyst component and a syndio specific metallocene catalyst component effective for the polymerization of propylene; and (b) contacting said catalyst system with propylene under polymerization conditions to produce a blend of an isotactic polypropylene component A that is crystalline and a syndiotactic polypropylene component B that is less crystalline than said isotactic polypropylene component A. Claim 25 is representative of the invention and is reproduced below:

25. A process for the preparation of an isotactic/syndiotactic polypropylene blend comprising:

providing a catalyst system comprising:

an isospecific metallocene catalyst component
represented by the formula



wherein Cp is a substituted cyclopentadienyl ring, Cp' is a substituted or unsubstituted fluorenyl ring, R'' is a structural bridge imparting stereorigidity to isospecific metallocene catalyst component, R¹ is a substituent on the cyclopentadienyl ring which is distal to the bridge, which distal substituent comprises a bulky group of the formula ZR*₃ in which Z is an atom from group 14 of the Periodic Table and each R* is the same or different and is chosen from a hydrogen or a hydrocarbonyl group having from 1-20 carbon atoms, R² is a substituent on the cyclopentadienyl ring which is proximal to the bridge and positioned non-vicinal to the distal substituent and is H or a group of the formula YR#₃ in which Y is an atom from group IVA, and each R# is the same or different and is chosen from a hydrogen or a

hydrocarbyl group having from 1-7 carbon atoms, R^3 is a further substituent on the cyclopentadienyl ring and may be the same or different from R^2 and is H or a group of the formula $YR\#_3$ in which Y is an atom from group 14, and each $R\#$ is the same or different and is chosen from a hydrogen or a hydrocarbyl group having from 1-7 carbon atoms, each R'_n is the same or different and is a hydrocarbyl group having from 1-20 carbon atoms, and n is an integer of from 0-8; M is a metal atom from group 4 of the Periodic Table or is vanadium; and each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen; and

a syndiospecific metallocene catalyst component represented by the formula:



wherein Cp is a substituted or unsubstituted cyclopentadienyl ring, Cp' is a substituted or unsubstituted fluorenyl ring, R'' is a structural bridge imparting stereoridity to the syndiospecific metallocene catalyst component, each R is the same or different and is a hydrocarbyl group having from 1-20 carbon atoms, each R' is the same or different and is a hydrocarbyl group having from 1-20 carbon atoms, and x and y are independently an integer of from 0-4 and 0-8 respectively; M is a metal atom from group 4 or is vanadium; and each Q is a hydrocarbon having from 1-20 carbon atoms or is a halogen; and wherein the substituents are selected in order to impart bilateral symmetry to the catalyst component; and

contacting said catalyst system with propylene under polymerization conditions to produce a blend of an isotactic polypropylene component A that is crystalline and a syndiotactic polypropylene component B that is less crystalline than said isotactic polypropylene component A, said blend being characterized by a molecular weight distribution that has a single composite peak and a polydispersity of 4 or less.

Claims 12-17 and 22-25 stand rejected under 35 U.S.C. § 103(a) over Shamsoum, U.S. Pat. No. 6,13,683, issued on November 7, 2000, in view of Kawai, European Patent No. 1,138,687, published October 4, 2001; Claims 18-21 stand rejected under 35 U.S.C. § 103(a) over Shamsoum in view of Kawai, and Demain, PCT International Patent No WO 00/60148² published October 12, 2000.

ISSUES ON APPEAL

Appellant contends, regarding the syndiospecific metallocene component, that Shamsoum does not teach a syndiospecific metallocene component including a Cp ring and a fluorenyl ring, as recited in pending claim 25. Relying on *In re Baird*, 16 F.3d 380, 382 (Fed. Cir. 1992), Appellant contends that “there must be a suggestion in the reference to select the particular combination of variables in the formula”.³ (App. Br. 4). Regarding the isospecific metallocene component, Appellant contends that the prior art would not have led the skilled person to replace the indenyl ligands of Shamsoum with the ligands taught by Kawai because such a replacement would render the catalyst of Shamsoum inoperable for the

² The Examiner cited the U.S. Patent No. 6,646,051, issued on November 11, 2003 as an English language equivalent for the WO 00/60148 reference. (Ans. 4).

³ Appellant has grouped their arguments for claims 12-17 and 19-25 together. While Appellant addresses separately rejected claims 18-21, Appellant relies on the reasons presented in rebuttal to the Examiner’s rejection of claim 25. (App. Br. 6). Consequently, the appealed claims stand or fall with claim 25. Our analysis will be limited thereto.

intended purpose, specifically, the preparation of bimetallic catalyst systems including indenyl bridged metallocenes to produce bimodal molecular weight distribution compositions.. (App. Br. 5).

The issue presented is: did Appellant identify reversible error in the Examiner's rejection of claim 25 under § 103? We answer this question in the negative. The issue turns on whether it would have been obvious to a person of ordinary skill in the art to utilize a catalyst system comprising a syndiospecific metallocene component including a Cp ring and a fluorenyl ring and an isospecific metallocene component containing a bridged cyclopentadienyl and fluorenyl ligand to prepare an isotactic/syndiotactic polypropylene blend.

OPINION

We have thoroughly reviewed each of Appellant's arguments for patentability. However, we are in complete agreement with the Examiner that the claimed subject matter is not patentable within the meaning of § 103 in view of the applied prior art. Accordingly, we will sustain the Examiner's rejection.

The Examiner found that Shamshoum teaches a process for the preparation of isotactic and syndiotactic polypropylene blend by polymerization of propylene in the presence of a catalyst composition prepared by supporting an isotactic metallocene catalyst and a syndiotactic metallocene catalyst. (Ans. 3; Shamshoum, col. 1, ll. 22-29, col. 2, ll. 2). The Examiner found that Ewen, a reference incorporated by reference in Shamshoum, describes a metallocene catalyst comprising syndiotactic

metallocene components including isopropyl(fluorenyl)(cyclopentadienyl) hafnium dichloride and isopropyl(fluorenyl)(cyclopentadienyl) zirconium dichloride (Shamshoum, col. 5, ll. 64-67; Ewen, col. 9, Ex. 1 and col. 11, Ex. 3). The Examiner further noted that Shamshoum does not expressly teach the isotactic metallocene component to be a metallocene containing a bridged cyclopentadienyl and fluorenyl ligand. However, the Examiner found that Kawai describes that it was known to use a metallocene containing a bridged cyclopentadienyl and fluorenyl ligand to prepare isotactic propylene polymers. (Ans. 4; Kawai, Abstract, paragraphs [0107]-[0134], and Examples 47-126). The Examiner concluded that a person of ordinary skill in the art would have found it obvious to prepared Shamshoum's isotactic and syndiotactic polypropylene blend utilizing a metallocene catalysts including isopropyl(fluorenyl)(cyclopentadienyl) hafnium dichloride and isopropyl(fluorenyl)(cyclopentadienyl) zirconium dichloride, each complex respectively containing a cyclopentadienyl ring and a fluorenyl ring.

“Section 103 forbids issuance of a patent when ‘the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.’” *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1734 (2007) (citing 35 U.S.C. § 103 (a)). The legal question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and

(4) secondary considerations, if any. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). *See also KSR*, 127 S. Ct. at 1734.

As shown by the findings above, a person of ordinary skill in the art would have recognized that it was known to form and utilize a metallocene catalyst which has two different sites, syndiospecific and isospecific, on the same support. (See Shamshoum). Regarding the syndiospecific metallocene catalyst component, the Examiner cited prior art that establishes that the formation of a syndiospecific metallocene component including a Cp ring and a fluorenyl ring was known to persons of ordinary skill in the art. Likewise, regarding isospecific metallocene catalyst component the Examiner cited prior art that establishes that the formation of an isospecific metallocene component including a Cp ring and a fluorenyl ring was known to persons of ordinary skill in the art. Thus, the Examiner properly concluded that a person of ordinary skill in the art would have reasonably expected that the known syndiospecific metallocene component and isospecific metallocene component would have been suitable for the formation of a metallocene catalyst comprising a syndiospecific metallocene component and isospecific metallocene component on the same support suitable for preparation of polypropylene blends. The Examiner also properly concluded that a person of ordinary skill in the art would have found it obvious to prepare an isotactic and syndiotactic polypropylene blend utilizing a metallocene catalysts including isopropyl(fluorenyl)(cyclopentadienyl) hafnium dichloride and isopropyl(fluorenyl)(cyclopentadienyl) zirconium dichloride, each complex respectively containing a cyclopentadienyl ring and a fluorenyl ring.

The prior art relied upon by the Examiner establishes that a person of ordinary skill in the art would have recognized that a metallocene containing a bridged cyclopentadienyl and fluorenyl ligand may be used to prepare polypropylene comprising syndiotactic propylene polymers and isotactic propylene polymers.

Appellant's arguments regarding the syndiospecific metallocene component and the isospecific metallocene component are not persuasive for the reasons set forth above. "[W]hen a patent claims a structure already known in the prior art that is altered by mere substitution of one element for another known in the field, the combination must do more than yield a predictable result." *KSR*, 127 S. Ct. at 1740. Appellant has not directed us to evidence that establishes the presently claimed invention achieves more than predictable results.

Appellant's arguments (Br. 4) regarding Shamshoum's failure to have the claimed polypropylene blend with a molecular weight distribution that has a single composite peak are not persuasive for the reasons stated in the Answer page 7. A person of ordinary skill in the art would have recognized the conditions necessary to produce a unimodal polypropylene blend from the teachings of the cited prior art. Appellant has failed to refute the Examiner's position in responsive briefing.

For the foregoing reasons and those stated in the Answer, we affirm the rejections presented in this appeal.

Appeal 2008-3875
Application 10/562,718

ORDER

The rejections of claims 12-17 and 22-25 under 35 U.S.C. § 103(a) over Shamshoum and Kawai; and claims 18-21 under 35 U.S.C. § 103(a) over Shamshoum, Kawai, and Demain are affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED

PL Initial:
sld

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